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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/534,378	10/13/2005	Tsuneharu Tomita	2005-0743A	4986

513 7590 11/19/2008
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EXAMINER	
SNYDER, ZACHARY J	

ART UNIT	PAPER NUMBER
2889	

MAIL DATE	DELIVERY MODE
11/19/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/534,378	Applicant(s) TOMITA ET AL.	
	Examiner Zachary Snyder	Art Unit 2889	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 July 2008*.

2a)☒ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 May 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Receipt is acknowledged of applicant's amendment filed 7/29/2008. Claims 1-20 are pending and an action on the merits is as follows.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4, 6, 8-12, and 14-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2000-091083 to Naoki et al. in view of U.S. Patent 7,417,371 B2 to Birnstock et al.

In regard to claim 1, Naoki discloses a production method of an organic light emitting element comprising steps of forming each layer of a transparent electrode (translucent part 12a functions as the anode, paragraph 18, Figure 1a-b) and a metal layer (metallic material part 12b, paragraph 18) sequentially on a transparent substrate (transparent substrate 11, paragraph 17);

forming a first electrode composed of the transparent electrode and the metal layer (anode part 12 composed of wrap metallic part 12b and transparent electrical conducting material part 12a, paragraph 18);

exposing a strip-shaped area (shown in figure 1b to have rectangular strip-shapes) of the transparent electrode of the first electrode by removing the metal layer intersecting the

transparent electrode (metallic part 12b is etched into tapered shape, paragraph 23) which corresponds to the pixel (light emitting area between metallic parts 12b is defined by this etching of 12b into a tapered shape) of the first electrode to expose the transparent electrode (translucent part 12a);

forming an organic layer (organic layer 13, paragraph 17) to coat the exposed strip-shaped area of the transparent electrode (translucent part 12a);

and forming a second electrode (cathode wiring part 14, paragraph 17) on the organic layer.

Naoki does not teach that the size of the pixel is specified by a pair of opposite edges of the transparent electrode and a pair of opposite edges of the metal layer at the exposed strip-shaped area of the transparent electrode.

Birnstock teaches and organic electroluminescent device that has a pixel that is defined by an opposite edges of a pixel defining layer and opposite edges of an electrode (shown in figure 5 that the pixel 10 is defined by the edges of the electrode 1 and pixel defining layer 5.

At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Naoki and Birnstock before him or her, to modify the pixel defining layer (metallic parts 12b) of Naoki so that the edges of the pixel are defined by opposite edges of the pixel defining layer and the opposite edges of the electrode as taught by Birnstock in order to reduce the size of the non-illuminating space between adjacent pixels.

In regard to claim 2, Naoki in view of Birnstock teaches the production method of an organic light emitting element as defined in claim 1, and Naoki teaches that the metal layer is

formed of a metal that is etched selectively instead of the transparent electrode (metallic part 12b is etched into tapered shape, paragraph 23, and the transparent electrode is not etched so the metal layer is being selectively etched).

In regard to claim 3, Naoki in view of Birnstock teaches the production method of an organic light emitting element as defined in claim 1, but Naoki does not specifically state that the metal layer (metallic part 12b) is formed of a metal having a work function smaller than a work function of the material of the transparent electrode (translucent part 12a).

Applicant has identified in the specification that when ITO is used as the transparent electrode (Naoki's translucent part 12a), it is possible and desirable to use Cu, Al, or Ag as the material of the metal layer (Naoki's metallic part 12b). Naoki shows in Table 1 several metals that are acceptable to be used as the metallic part 12b and this table includes Ag, Al, and Cu and states that ITO is used as the transparent electrode (paragraph 19). Since the applicant states that the metals selected to be used as the metal layer in his invention have a work function smaller than the material of the transparent electrode and later discloses Cu, Al, and Ag as possible elements for the claimed metal layer, it is reasonable to assume that Naoki's metallic part 12b will have a work function that is smaller than the work function of the translucent part 12a when using Ag, Al, or Cu.

In regard to claim 4, Naoki in view of Birnstock teaches the production method of an organic light emitting element as defined in claim 1, and Naoki teaches the production method further comprising forming an insulating layer (referred to as inorganic insulating film, but not

labeled in drawings, and this silicon nitride inorganic insulating layer is formed between organic layer 13 and anode parts 12, paragraph 36) on an upper surface of the metal layer (anode metallic part 12b).

In regard to claim 6, Naoki in view of Birnstock teaches the production method of an organic light emitting element as defined in claim 1, and Naoki teaches that removing the metal layer (metallic part 12b) further comprises steps of providing the metal layer with a portion reducing in thickness toward the pixel edge (metal part 12b is etched into tapered shape, paragraph 23, shown in figure 1a), and

forming at the pixel edge a stair of the metal layer (metallic part 12b) on the transparent electrode (translucent part 12a) so as to have a thickness not more than that of the organic layer (metallic part 12b is tapered and is reducing in width down to a point. At this point, and possibly before that, metallic layer 12b will be less in thickness than the organic layer 13).

In regard to claim 8, Naoki in view of Birnstock teaches the production method of an organic light emitting element as defined in claim 6, and Naoki teaches that the portion reducing in thickness (metallic part 12b) is stepped such that the thickness reduces gradually toward the pixel edge (The metallic part 12b is tapered at some non-disclosed angle and gradually reducing in thickness).

In regard to claim 9, Naoki in view of Birnstock teaches the production method of an organic light emitting element as defined in claim 1, and Naoki teaches that the first electrode

(anode 12) is a grid-shaped electrode separated electrically (grid-shape is shown in figure 1b, the pixel size corresponds to 12a and does not vary),

and the removing the metal layer further comprises removing the metal layer in a form of strip so as to cross (drawing 1a shows tapered metallic part 12b cross section) the grid-shaped electrode (anode wires part 12 is formed in the stripe shape and confined by metallic part 12b which is etched into its tapered shape, paragraph 18 and drawing 1b).

In regard to claim 10, Naoki discloses an organic light emitting element emitting light as a pixel comprising

a transparent electrode (translucent part 12a) formed on a transparent substrate (transparent substrate 11);

a metal layer formed on the transparent electrode except for a strip-shaped area (shown in figure 1b that metal layer 12b has strip-shaped areas that are the pixels) corresponding to the pixel intersecting (area between metallic parts 12b is defined by this etching of 12b into a tapered shape) the transparent electrode (translucent part 12a);

an organic layer (organic layer 13, paragraph 17) coating the transparent electrode at the strip-shaped area corresponding to the pixel; and

a second layer (cathode wiring part 14, paragraph 17) formed on the organic layer.

Naoki does not teach that the transparent electrode has the same width as the pixel and that the size of the pixel is specified by a pair of opposite edges of the transparent electrode and a pair of opposite edges of the metal layer at tan exposed area of the transparent electrode.

Birnstock teaches and organic electroluminescent device that has a pixel that is defined by an opposite edges of a pixel defining layer and opposite edges of an electrode (shown in figure 5 that the pixel 10 is defined by the edges of the electrode 1 and pixel defining layer 5.

At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Naoki and Birnstock before him or her, to modify the pixel defining layer (metallic parts 12b) of Naoki so that the edges of the pixel are defined by opposite edges of the pixel defining layer and the opposite edges of the electrode as taught by Birnstock in order to reduce the size of the non-illuminating space between adjacent pixels.

In regard to claim 11, Naoki in view of Birnstock teaches the organic light emitting element as defined in claim 10, and Naoki teaches wherein an insulating layer (referred to as inorganic insulating film, but not labeled in drawings, and this silicon nitride inorganic insulating layer is formed between organic layer 13 and anode parts 12, paragraph 36) is formed on the upper surface of the metal layer (metallic part 12b).

In regard to claim 12, Naoki in view of Birnstock teaches the organic light emitting element as defined in claim 10 and Naoki teaches that the metal layer (metallic part 12b) is provided with a portion reducing in thickness toward the pixel edge (metal part 12b is etched into tapered shape, paragraph 23, shown in figure 1a),

and a stair of the metal layer on the transparent electrode is formed at the pixel edge so as to have a thickness not more than that of the organic layer (metallic part 12b is tapered and is

reducing in width down to a point. At this point, and possibly before that, metallic layer 12b will be less in thickness than the organic layer 13).

In regard to claim to claim 14, Naoki in view of Birnstock teaches the organic light emitting element as defined in claim 12 and Naoki teaches that the portion reducing (metallic part 12b) in thickness is stepped such that the thickness reduces gradually toward the pixel edge (The metallic part 12b is tapered at some non-disclosed angle and in a mathematical mind-set comprised of tiny steps gradually reducing in thickness).

In regard to claim 15, Naoki in view of Birnstock teaches the organic light emitting element as defined claim 10 and Naoki teaches that the transparent electrode (translucent part 12a) is a grid-shaped electrode separated electrically (grid-shape is shown in figure 1b, the pixel size corresponds to 12a and does not vary).

In regard to claim 16, Naoki in view Birnstock teaches an image forming device using the light emitting element defined in claim 15 as a light source thereof (the invention relates to an organic electroluminescence display, paragraph 1 of Naoki).

In regard to claim 17, Naoki in view Birnstock teaches a display unit using the light emitting element defined in claim 15 (the invention relates to an organic electroluminescence display, paragraph 1 of Naoki).

In regard to claim 18, Naoki in view Birnstock teaches the production method of an organic light emitting element as defined in claim 2 and Naoki teaches that the first electrode (translucent part 12a) is a grid-shaped electrode separated electrically (grid-shape is shown in figure 1b, the pixel size corresponds to 12a and does not vary),

and the removing the metal layer further comprises removing the metal layer in a form of strip so as to cross (drawing 1a shows tapered metallic part 12b cross section) the grid-shaped electrode (anode wires part 12 is formed in the stripe shape and confined by metallic part 12b which is etched into its tapered shape, paragraph 18 and drawing 1b).

In regard to claim 19, Naoki in view Birnstock teaches the production method of an organic light emitting element as defined in claim 3 and Naoki teaches that the first electrode (translucent part 12a) is a grid-shaped electrode separated electrically (grid-shape is shown in figure 1b, the pixel size corresponds to 12a and does not vary),

and the removing the metal layer further comprises removing the metal layer in a form of strip so as to cross (drawing 1a shows tapered metallic part 12b cross section) the grid-shaped electrode (anode wires part 12 is formed in the stripe shape and confined by metallic part 12b which is etched into its tapered shape, paragraph 18 and drawing 1b).

In regard to claim 20, Naoki in view Birnstock teaches the production method of an organic light emitting element as defined in claim 3 and Naoki teaches that the first electrode (translucent part 12a) is a grid-shaped electrode separated electrically (grid-shape is shown in figure 1b, the pixel size corresponds to 12a and does not vary),

and the removing the metal layer further comprises removing the metal layer in a form of strip so as to cross (drawing 1a shows tapered metallic part 12b cross section) the grid-shaped electrode (anode wires part 12 is formed in the stripe shape and confined by metallic part 12b which is etched into its tapered shape, paragraph 18 and drawing 1b).

Claims 5, 7, and 13 rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2000-091083 to Naoki et al. in view of U.S. Patent 7,417,371 B2 to Birnstock et al., as applied to claims 1-4, 6, 8-12, and 14-20 above, in view of U.S. Patent 6,280,861 B1 to Hosokawa et al.

In regard to claim 5, Naoki in view of Birnstock teaches the production method of an organic light emitting element as defined in claim 1.

The taught metal layer does have some thickness, but it is not specifically stated that removing the metal layer further comprises forming the metal layer to be not more than 3 micrometers thick at the pixel edge.

Hosokawa discloses an organic EL device wherein the production method comprises the steps of forming a transparent electrode on a substrate and then forming an organic layer containing an organic light-emitting material on the transparent electrode (COL. 4, LINE 3-7). The transparent electrode has an amorphous electrically conductive oxide layer and the organic

layer is formed on the amorphous electrically conductive oxide layer (COL. 4, LINE 13-15 and 18-20) so the amorphous electrically conductive oxide layer must be formed on the surface of the transparent electrode opposite of the substrate. Figure 1(a) of Hosokawa shows that the transparent electrode 1 has a side surface 2 formed at some angle Θ_1. The thickness of the amorphous electrically conductive oxide layer is preferably 500 to 1,000 angstroms (COL. 5, LINE 8-11).

3 micrometers is equivalent to 30,000 angstroms and since Hosokawa's metal layer (amorphous electrically conducting oxide layer which is contains zinc and indium, COL. 4, LINE 21-23) is preferably 1,000 angstroms (0.1 micrometers) at most, it will be less than 3 micrometers thick at the pixel edge.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to form the metal layer of Naoki and Birnstock's combined invention so that it will be less than 3 micrometers thick at the pixel edge as taught by Hosokawa to achieve low electric resistance and a high light transmittance (COL. 5, LINE 19-22).

In regard to claim 7, Naoki in view of Birnstock teaches the production method of an organic light emitting element as defined in claim 6.

The taught metal layer is reducing towards the pixel edge at some angle but it is not specifically stated that the portion reducing in thickness is a slanting surface having an angle of 30 or less degrees toward the pixel edge.

Hosokawa discloses an organic EL device wherein the production method comprises the steps of forming a transparent electrode on a substrate and then forming an organic layer

containing an organic light-emitting material on the transparent electrode (COL. 4, LINE 3-7). The transparent electrode has an amorphous electrically conductive oxide layer and the organic layer is formed on the amorphous electrically conductive oxide layer (COL. 4, LINE 13-15 and 18-20) so the amorphous electrically conductive oxide layer must be formed on the surface of the transparent electrode opposite of the substrate. Figure 1(a) of Hosokawa shows that the transparent electrode 1 has a side surface 2 formed at some angle Θ_1. Θ_1 is preferably 60 degrees or less or particularly preferably to be 40 degrees or less (COL. 6, LINE 39-41).

In regard to claim 13, Naoki discloses the organic light emitting element as defined in claim 12.

The taught metal layer is reducing towards the pixel edge at some angle but it is not specifically stated that the portion reducing in thickness is a slanting surface having an angle of 30 or less degrees toward the pixel edge.

Hosokawa discloses an organic EL device wherein the production method comprises the steps of forming a transparent electrode on a substrate and then forming an organic layer containing an organic light-emitting material on the transparent electrode (COL. 4, LINE 3-7). The transparent electrode has an amorphous electrically conductive oxide layer and the organic layer is formed on the amorphous electrically conductive oxide layer (COL. 4, LINE 13-15 and 18-20) so the amorphous electrically conductive oxide layer must be formed on the surface of the transparent electrode opposite of the substrate. Figure 1(a) of Hosokawa shows that the transparent electrode 1 has a side surface 2 formed at some angle Θ_1. Θ_1 is preferably 60 degrees or less or particularly preferably to be 40 degrees or less (COL. 6, LINE 39-41).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the production of an organic light emitting element taught by Naoki in view of Birnstock according to the limitations in claims 7 and 13 as taught by Hosokawa because Hosokawa states that thick electrodes will cause problems with "height-level-difference-induced breakage" (COL. 1 & 2, LINE 59-67 & LINE 1-3) and that these specific angles will prevent the "height-level-difference-induced breakage" (COL. 6, LINE 40-43). Therefore Hosokawa establishes that the thickness of the electrode is directly related to this breakage problem and that the angle of the metal layer will prevent the breakage because it will reduce the electrode's thickness. The applicant has stated that the claimed angle of the metal layer's reducing portion will allow the metal layer to be thin (Page 9, Line 14-15). Hosokawa and the applicant are using the same line of reasoning for the claimed angle of metal layer's reducing portion and it has been held that claimed ranges of a result effective variable are unpatentable unless they produce a new and unexpected result.

These claims are prima facie obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. It has been held that claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zachary Snyder whose telephone number is (571)270-5291. The examiner can normally be reached on Monday through Thursday, 7:30AM to 6PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Toan Ton can be reached on (571)272-2303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Zachary Snyder/
Examiner, Art Unit 2889

/Karabi Guharay/
Primary Examiner, Art Unit 2889